Building tools from the outside in
(or how to bring UCD to embedded Linux)

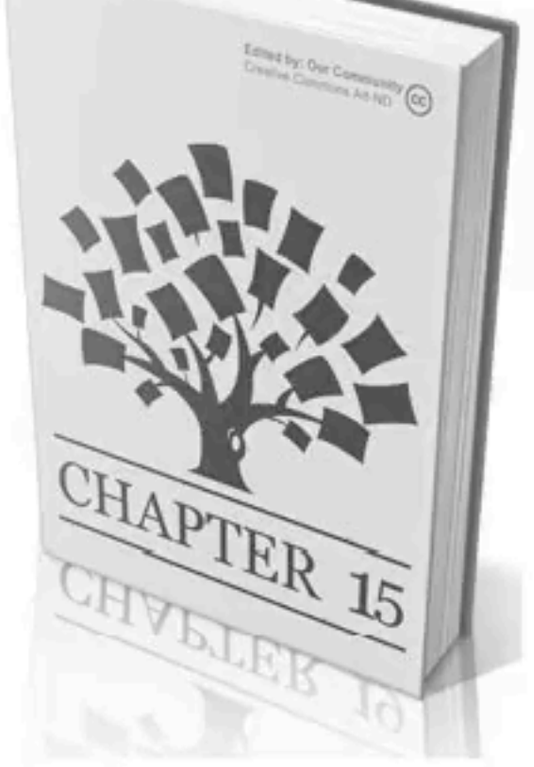
Belén Barros Pena

Embedded Linux Conference Europe

Dusseldorf - 14 Oct 2014

15. Usability Evaluation

by Gilbert Cockton. How to cite in your report.



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Put simply, usability evaluation assesses the extent to which an interactive system is easy and pleasant to use. Things aren't this simple at all though, but let's start by considering the following propositions about usability evaluation:

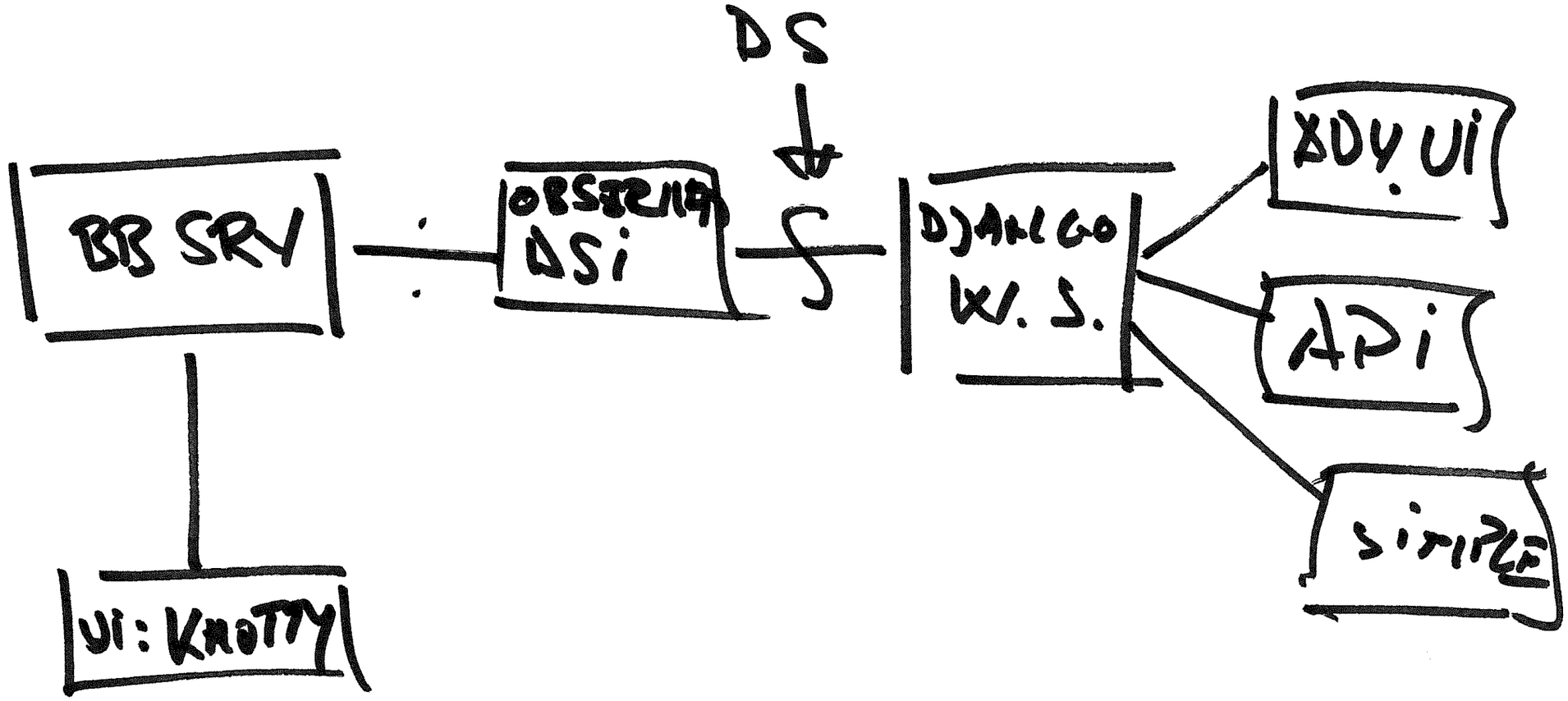
1. Usability is an inherent measurable property of all interactive digital technologies
2. Human-Computer Interaction researchers and Interaction Design professionals have developed evaluation methods that determine whether or not an interactive system or device is usable.
3. Where a system or device is usable, usability evaluation methods also determine the extent of its usability, through the use of robust, objective and reliable metrics
4. Evaluation methods and metrics are thoroughly documented in the Human-Computer Interaction research and practitioner literature. People wishing to develop expertise in usability measurement and evaluation can read about

OPEN ACCESS

BORING

Welcome
to hell

Fisher-Price®


DS
BB SRV
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W. S.
API
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photo by LOOMstudio

?

"Like industrial design, the discipline would start from the needs and desires of the people who use a product or service"

Bill Moggridge, Designing Interactions (2007)

Back in 2011 ...

I saw a demo of Suse Studio when I was in Vancouver (...) It did have a really nice, smooth sort of feel to it and a lot of thought had been put into how the user interface interacted with people.

I was with a couple of other people from the Yocto Project, and we looked at it (...) We dream of having a user interface that looks a bit like that.

The nail

Because there are so many permutations and so many ways for things to go wrong it seems like, at any point in time, if I try to config my conf files in Yocto and run a build, I have about 40% or 50% chance of it failing. That has been really the frustration.

GUIs are good at handling complexity

- Visibility of system status
- Error prevention ("defensive design")
- Recognition rather than recall
- Anticipation
- Metaphors
- Progressive disclosure

W W W eb?
Why?

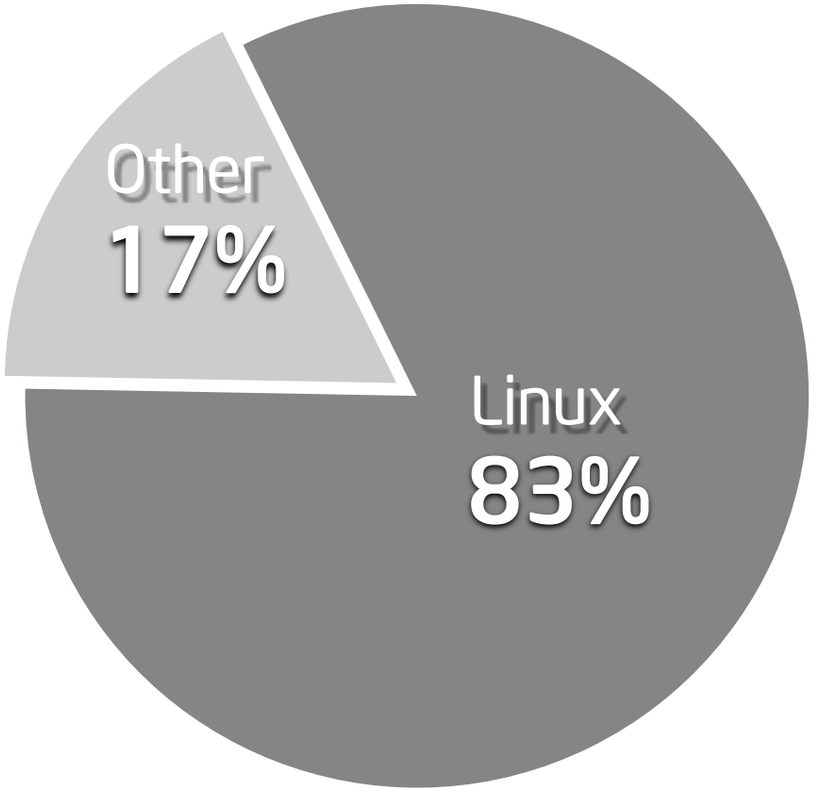
In my development environment I actually have machines in other rooms that I do most of my builds on, because they are noisy and I don't want them near me. Sharing some kind of web server that I just connected in from my desktop or my laptop or something, I'd be more than happy with that.

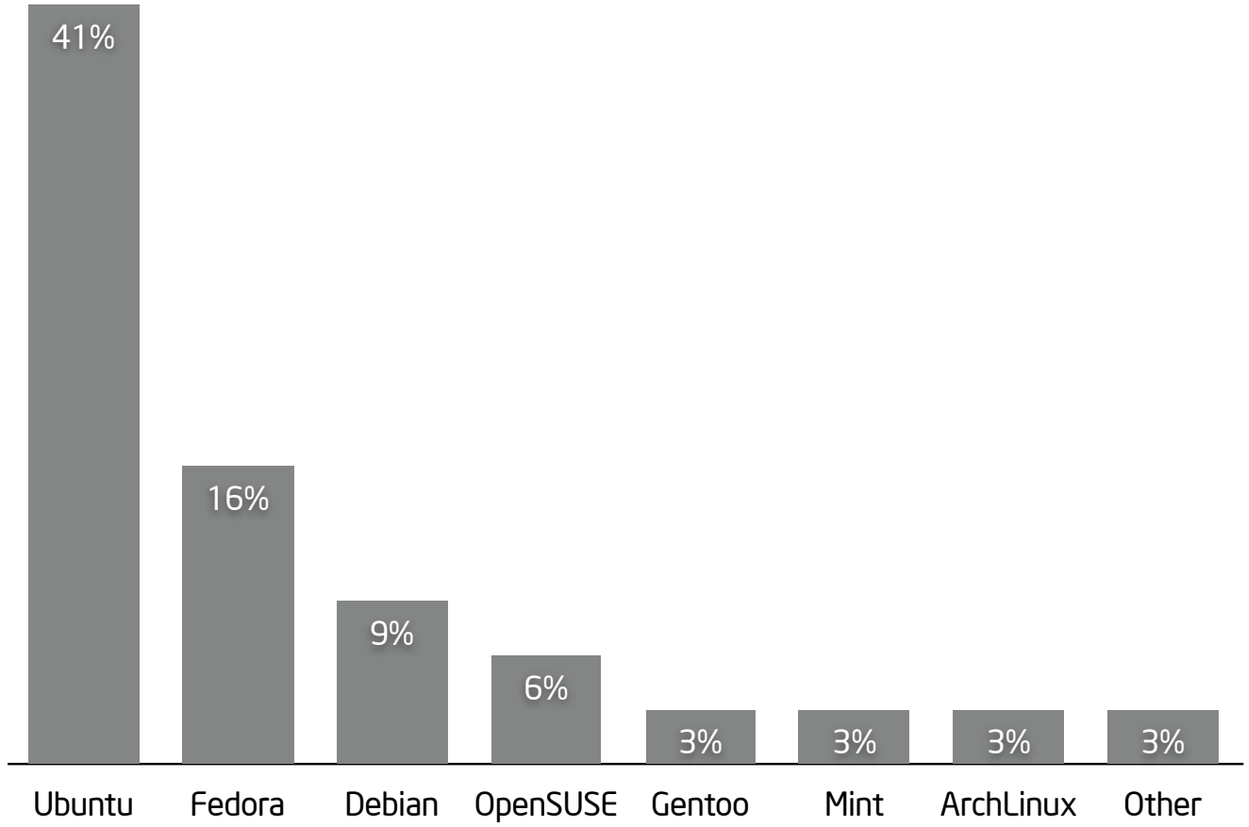
iBook

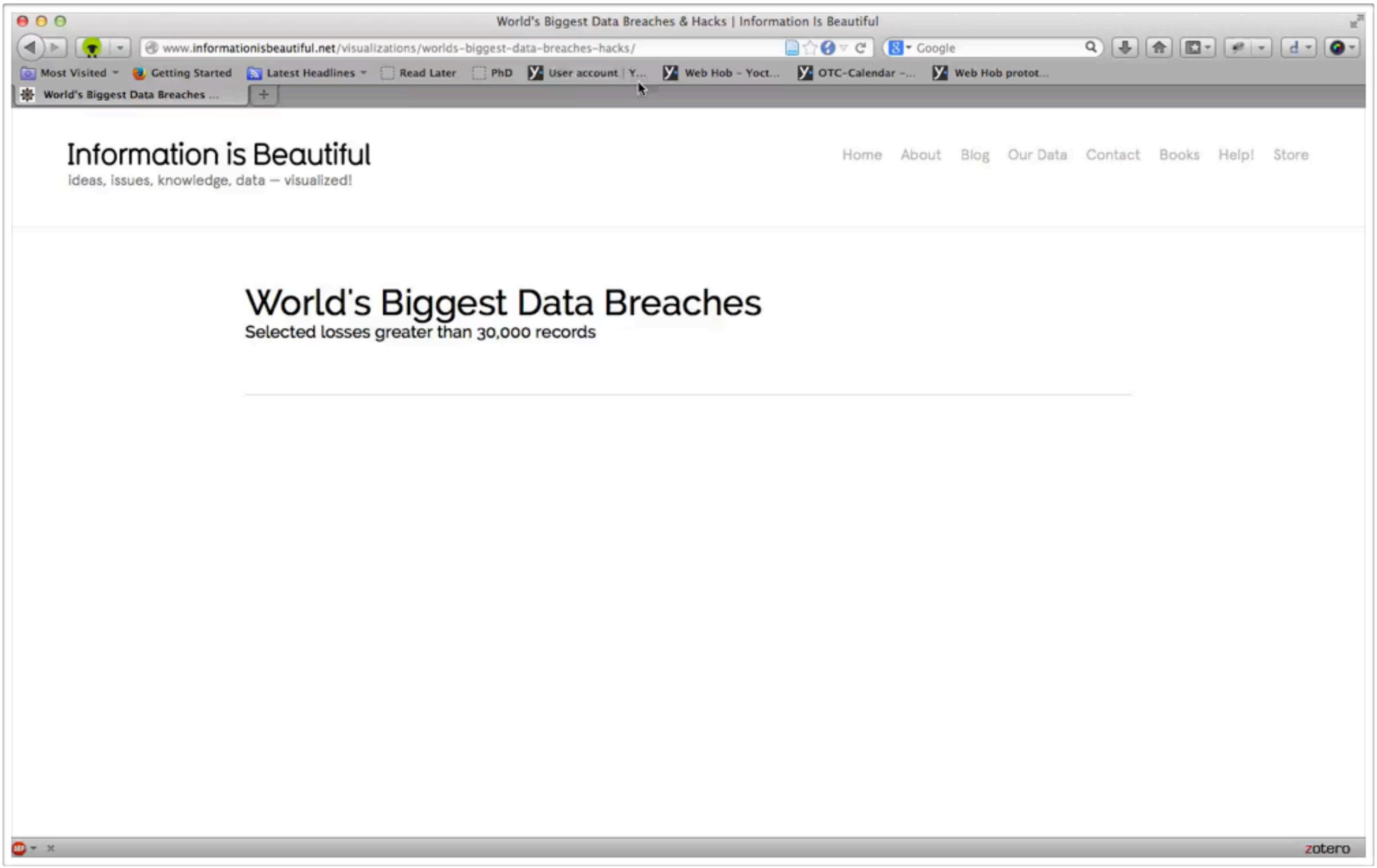
Yocto community survey results

The vast majority of respondents uses Linux as their main OS. Ubuntu, the most popular distribution, is used by 41% of respondents.

Which operating system do you use to get your job done?






World's Biggest Data Breaches & Hacks | Information Is Beautiful
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Google
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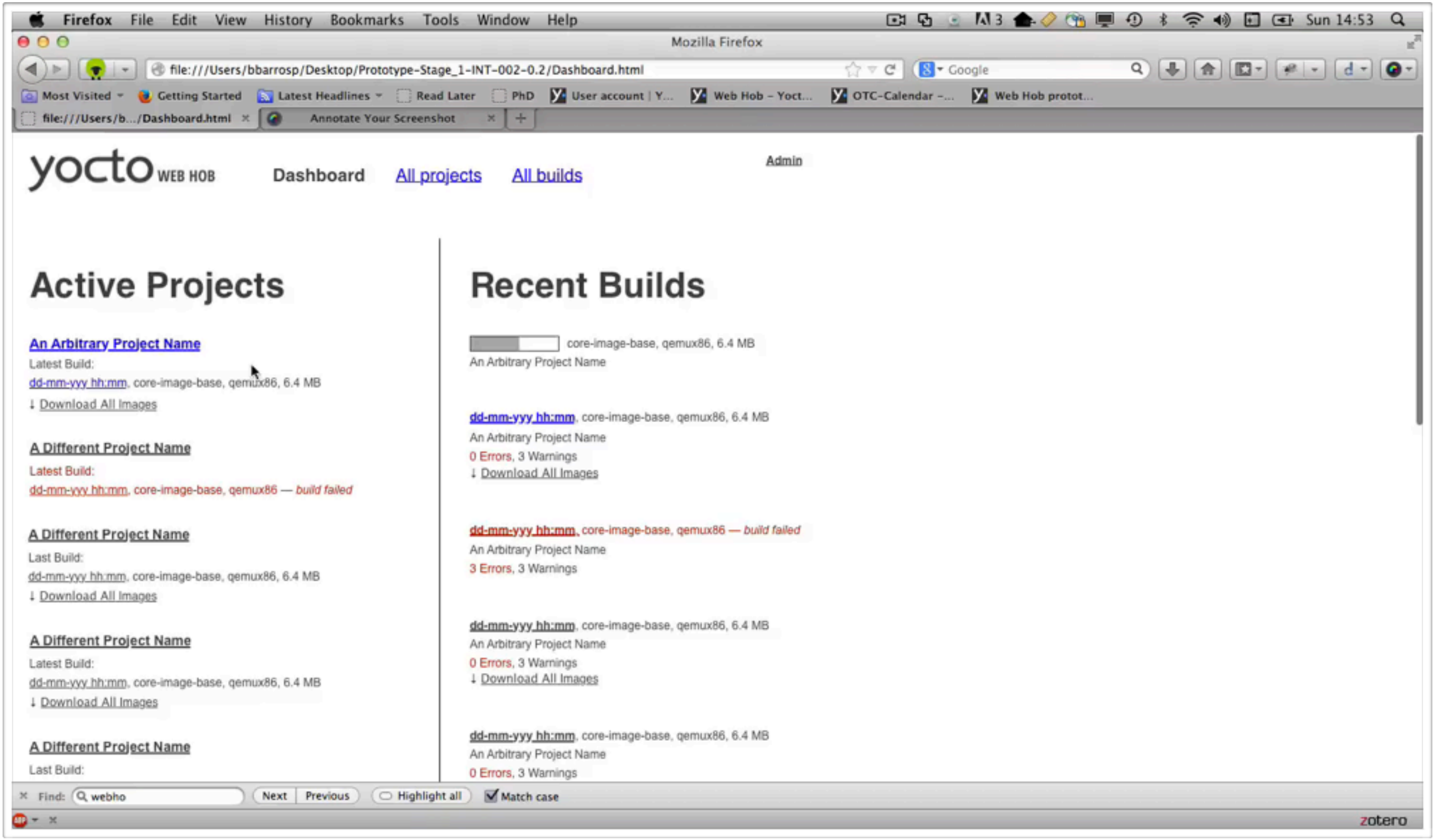
Latest Headlines
Read Later
PhD
User account | Y...
Web Hob - Yoct...
OTC-Calendar -...
Web Hob protot...
World's Biggest Data Breaches ...
Information is Beautiful
ideas, issues, knowledge, data — visualized!
Home
About
Blog
Our Data
Contact
Books
Help!
Store
World's Biggest Data Breaches
Selected losses greater than 30,000 records
zotero

Requirement	Feature	Grouping	In order to..	As...	I want to...
Create a collaborative error database to parse all crashes and error codes (e.g. bitbug)	Collaborative error database	Community	improve community-sourced error data	Web Hob	create a collaborative error database to parse error logs and codes (see GNOME bugzilla)
Enable search of recipes	Recipe search (and browse)	Browse & Search	benefit from the Yocto community	a user	use a tool to search and browse recipes
Enable user to investigate build errors by viewing community-sourced information about them	View community-sourced build error database	Community	benefit from the Yocto community	a user	browse and view a community-sourced build error database
Phone home with build & error logs into shared location which could be analysed and used as a resource	Send build and error log data to resource database ('phone home')	Community	improve community-sourced error data	a user	have Web Hob phone home with my build and error log data to improve the resource database
Enable secure sharing of source code and builds within a team (duplicate, may not exist)	Source code and build sharing (within team(	Browse & Search	find and use known good source code and builds	a user	use a tool to share and use shared source code and builds (on a team or global basis)
Enable sharing of built toolchains	Sharing of built toolchains	Browse & Search	find and use previous known good built toolchains	a user	use a tool to share and use shared built toolchains
Enable sharing of intermediate build sets	Sharing of intermediate build sets	Browse & Search	find and use previous known good intermediate build sets	a user	use a tool to share and use shared intermediate build sets
Enough user account support to allow for different permissions/access to different functionality	User account management	User management	control access to different functionality	an administrator	use a tool to set permissions and manage individual user accounts
Individuals in teams can specify builds locally or on servers (scheduled)	Build management tools (scheduled)	Build management	schedule builds for specific times and machines	a user	use a tool to manage build jobs
Manage resource usage and availability on shared build servers	Build server management (resource usage and availability)	Build management	manage shared build servers	an administrator	use a tool to manage resource usage and availability on shared build servers
Reusability of previous builds-- to leverage CPU time as well as allow users to find previous known good builds	Reusability of previous builds	Browse & Search	find and use previous known good builds	a user	be able to search and reuse known good builds
Support multi-user teams (multi-user accounts, permissions, team tools, etc)	Multi-user team management	User management	support multi-user teams	an administrator	use a tool to manage multi-user/team account and their permissions
Teams must be able to do work separately on local machines and then submit changes to the team server, to allow for coordinated builds	Team workflow management	Team support	support team workflows	Web Hob	allow individuals in a team to do work separately, then submit them for coordinated builds
To use web interface to launch build jobs on remote machines	Build management tools (basic)	Networked WH	use remote machines for build jobs	a user	use a tool to launch build jobs on remote machines
Enable to work offline for demonstration or local work purposes	Has offline mode	Security	use Web Hob offline	a user	be able to use Web Hob in an 'offline mode' for use locally or in locations without an internet connection (e.g. demonstrations)
Allow greater control over individual config options	Advanced configuration tools	Advanced	have more control in Web Hob	a user	be able to use advanced configuration tools from within Web Hob
Prioritise view of diagnostic and forensic data from colleagues	Set level of comparison of diagnostic and forensic data	Forensics & diagnostics	get more relevant help	a user	be able to specify 'colleagues only' or 'everyone' (or other levels of inclusion) when searching error database
Share diagnosis and forensic information (duplicate?)	Share diagnosis and forensic information	Community	help others diagnose and fix errors	a user	share my diagnosis and forensic data with other users
	Allow cancellation of network check when in progress	Usability			
	Reorder layers in GUI	Usability			
	Wizard for common workflows in creating main variants (Kiosk/Headless)	Getting started			
	View preferences for progress bars vs logs during build	Usability			

Support the migration of projects from a Web Hob instance to local environment					
Allow 'normal' programmers to easily create images	Quick start build tools	Getting started	make it easier to get started with Yocto	a user	have quick start build tools ready to use
Decrease setup time and effort for new users	n/a				
Enable easy install of Web Hob and automatic launch when ready	Easy installation process	Getting started	make it easier to get started with Yocto	a user	do an easy install of Web Hob and automatic launch when ready
Enable the ability to save and restore configuration settings	Save and restore config settings		save time and make WH better to use	a user	use a tool to save and restore my configuration settings
Enable users to select packages or pre-built packages through a GUI	n/a	Browse & Search	find a use known good packages and pre-built packages	a user	use a tool to share and use shared packages and pre-built packages
Allow the system to be customisable depending on if an individual, group, enterprise user…	Customisation for usage type (individual, group, enterprise)	User management	use Web Hob in the most relevant way	a user	be able to customise Web Hob based on the most relevant usage type (individual, group, enterprise)
Provide diagnostic abilities where build errors occur	Build error diagnostic tools	Forensics & diagnostics	save time and solve errors in building	a user	use diagnostic tools in Web Hob when build errors occur
Provide specification of build machine requirements	Provide specifications for build machines	Getting started	make it easier to get started with Yocto	a user	be able to access a specification of build machine requirements
Provide tools which isolate the user from host OS and proxy issues (and support with these)	Tools for managing host OS and proxy issues	Forensics & diagnostics	avoid/solve problems with host OS and proxy issues	a user	use a tool for managing host and proxy issues
Allow teams to open and modify files on server quickly	File viewing/editing tools	Security	be able to change files more quickly	a user	be able to easily open and modify files on the server from Web Hob
Optimise GUI for expert users to find, edit, etc pacakages by name	Package search by name/text (e.g. non-browse)	Browse & Search	preserve non-GUI based functionality	an expert user	be able to find packages by name/text when I know them
Provide a sandbox for creating test builds	Sandboxing for test builds	Security	test builds safely or without making extensive local configuration changes	a user	be able to use Web Hob in a sandbox mode
Provide a sandbox for new users to try out WH	Sandboxing for new users	Security	have lower barriers to learn and try out Web Hob safely	a new user	be able to use Web Hob in a sandbox mode/environment, with priority on my user experience
Enable sharing/duplication of configuration and setup process with others	Sharing of config and setup processes	Community	help others with config and setup process	a user	use tools to share my configs and setup processes with others
Lower overall volume of support requests by improving community tools	Provide more support in-application, or through wikis, mailing lists, etc	Community			
Show data and graphical visualisations of build contents, metrics, and forensics	Display graphical visualisations of build contents, metrics, and forensics	Forensics & diagnostics	get more information from build related data	a user	get, compare, and save graphical visualisations of build contents, metrics and forensics
Enable graphical browsing of available packages, by type and compatibility	Package browse and selection in a GUI	Browse & Search	make browsing of packages easier for new users	a user	graphically browse and select packages in a GUI
Enable set up on networks with strict firewall rules without manual config customisation	Networking and firewall management	Security	use Web Hob even when behind a strict firewall	a user	use a tool to manage firewall issues (without manual config)
Support source control without surfacing its complexity	Support for source control	Security	observe existing source control rules	Web Hob	make changes in accordance with source control, without showing unnecessary complexity to the user

builds & metrics


Firefox File Edit View History Bookmarks Tools Window Help
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Mozilla Firefox
file:///Users/bbarrosp/Desktop/Prototype-Stage_1-INT-002-0.2/Dashboard.html
Google
Most Visited
Getting Started
Latest Headlines
Read Later
PhD
User account | Y...
Web Hob - Yoct...
OTC-Calendar -...
Web Hob protot...
file:///Users/b.../Dashboard.html
Annotate Your Screenshot
yocto WEB HOB
Dashboard
All projects
All builds
Admin
Active Projects
An Arbitrary Project Name
Latest Build:
dd-mm-yyy hh:mm, core-image-base, qemux86, 6.4 MB
↓ Download All Images
A Different Project Name
Latest Build:
dd-mm-yyy hh:mm, core-image-base, qemux86 — build failed
A Different Project Name
Last Build:
dd-mm-yyy hh:mm, core-image-base, qemux86, 6.4 MB
↓ Download All Images
A Different Project Name
Latest Build:
dd-mm-yyy hh:mm, core-image-base, qemux86, 6.4 MB
↓ Download All Images
A Different Project Name
Last Build:
Recent Builds
core-image-base, qemux86, 6.4 MB
An Arbitrary Project Name
dd-mm-yyy hh:mm, core-image-base, qemux86, 6.4 MB
An Arbitrary Project Name
0 Errors, 3 Warnings
↓ Download All Images
dd-mm-yyy hh:mm, core-image-base, qemux86 — build failed
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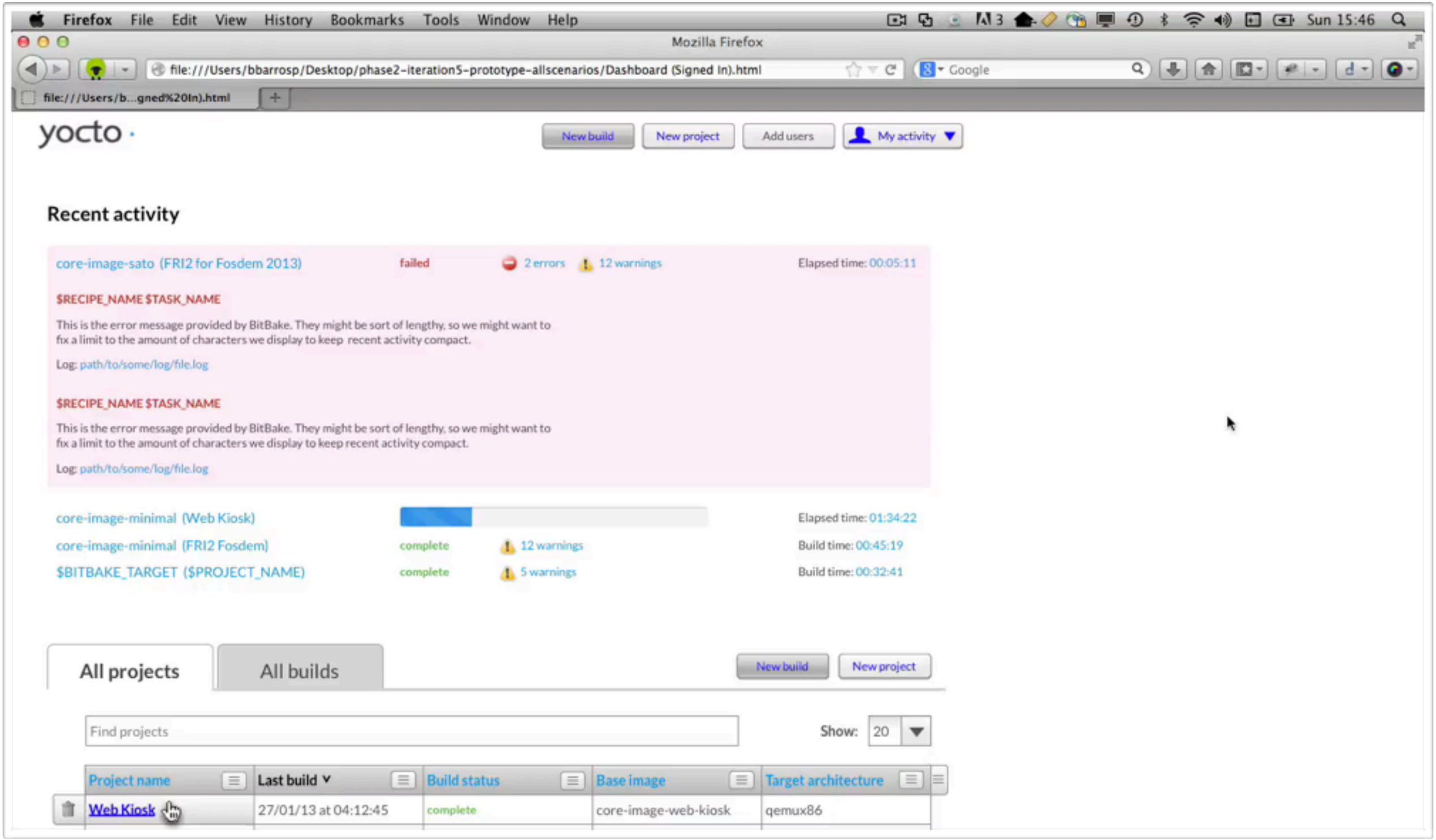
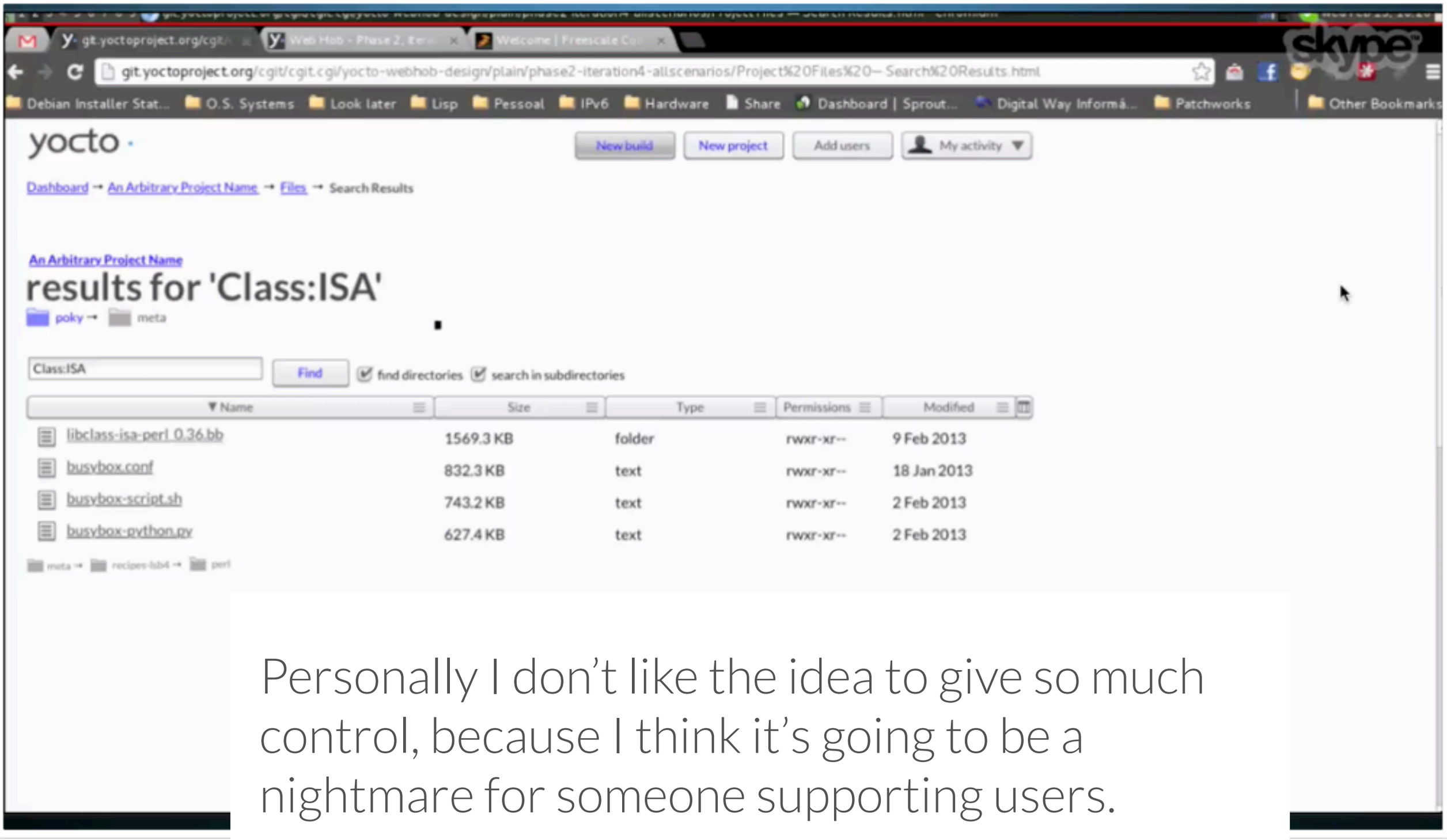
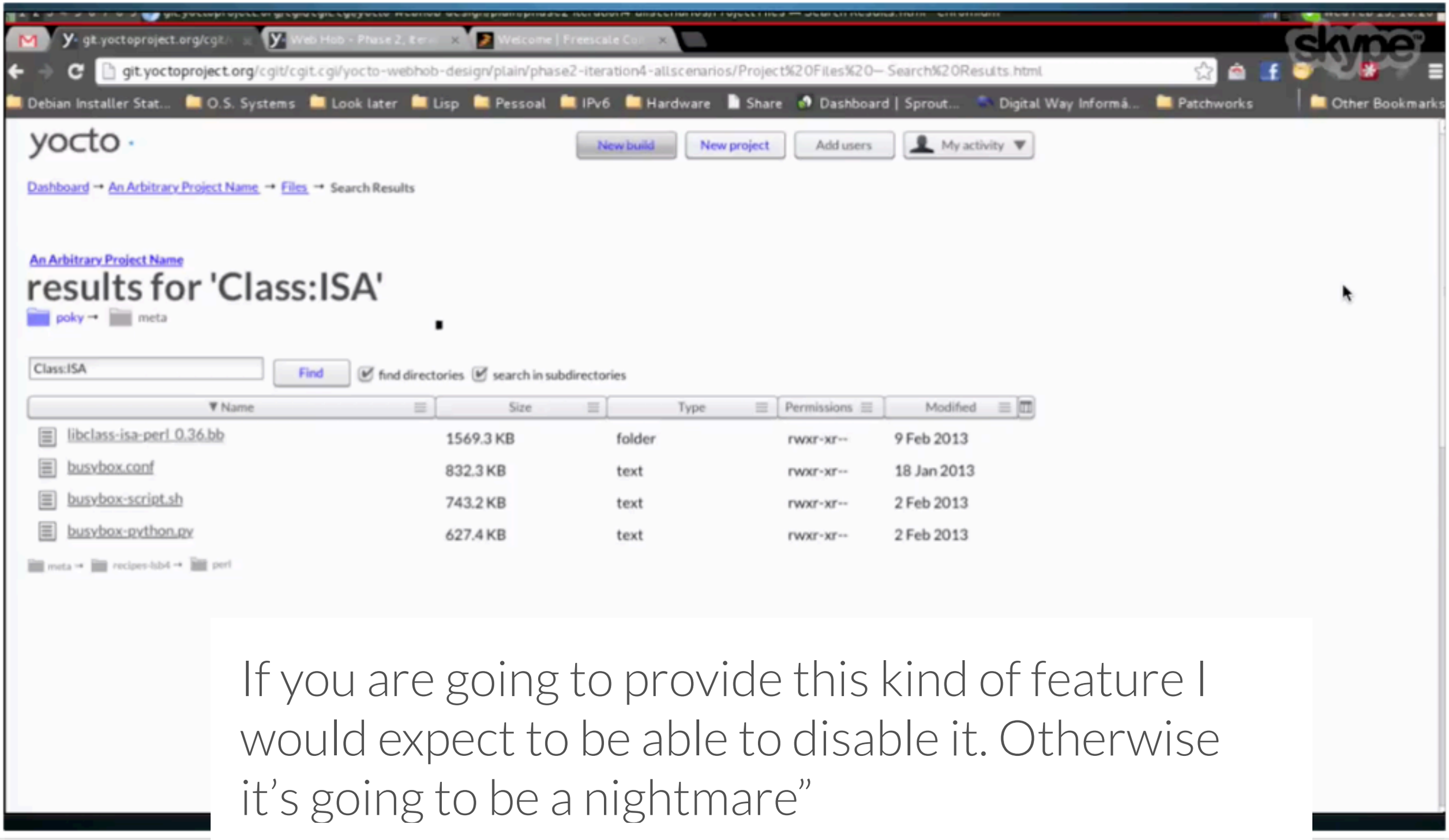
dd-mm-yyy hh:mm, core-image-base, qemux86, 6.4 MB
An Arbitrary Project Name
0 Errors, 3 Warnings
Find: webho
Next
Previous
Highlight all
Match case
zotero


Firefox File Edit View History Bookmarks Tools Window Help
Sun 15:46
Mozilla Firefox
file:///Users/bbarrosp/Desktop/phase2-iteration5-prototype-allscenarios/Dashboard (Signed In).html
Google
file:///Users/b...gned%20In).html
yocto
New build
New project
Add users
My activity
Recent activity
core-image-sato (FRI2 for Fosdem 2013)
failed
2 errors
12 warnings
Elapsed time: 00:05:11
$RECIPE_NAME $TASK_NAME
This is the error message provided by BitBake. They might be sort of lengthy, so we might want to fix a limit to the amount of characters we display to keep recent activity compact.
Log: path/to/some/log/file.log
$RECIPE_NAME $TASK_NAME
This is the error message provided by BitBake. They might be sort of lengthy, so we might want to fix a limit to the amount of characters we display to keep recent activity compact.
Log: path/to/some/log/file.log
core-image-minimal (Web Kiosk)
Elapsed time: 01:34:22
core-image-minimal (FRI2 Fosdem)
complete
12 warnings
Build time: 00:45:19
$BITBAKE_TARGET ($PROJECT_NAME)
complete
5 warnings
Build time: 00:32:41
All projects
All builds
New build
New project
Find projects
Show: 20
Project name
Last build
Build status
Base image
Target architecture
Web Kiosk
27/01/13 at 04:12:45
complete
core-image-web-kiosk
qemux86

builds & metrics

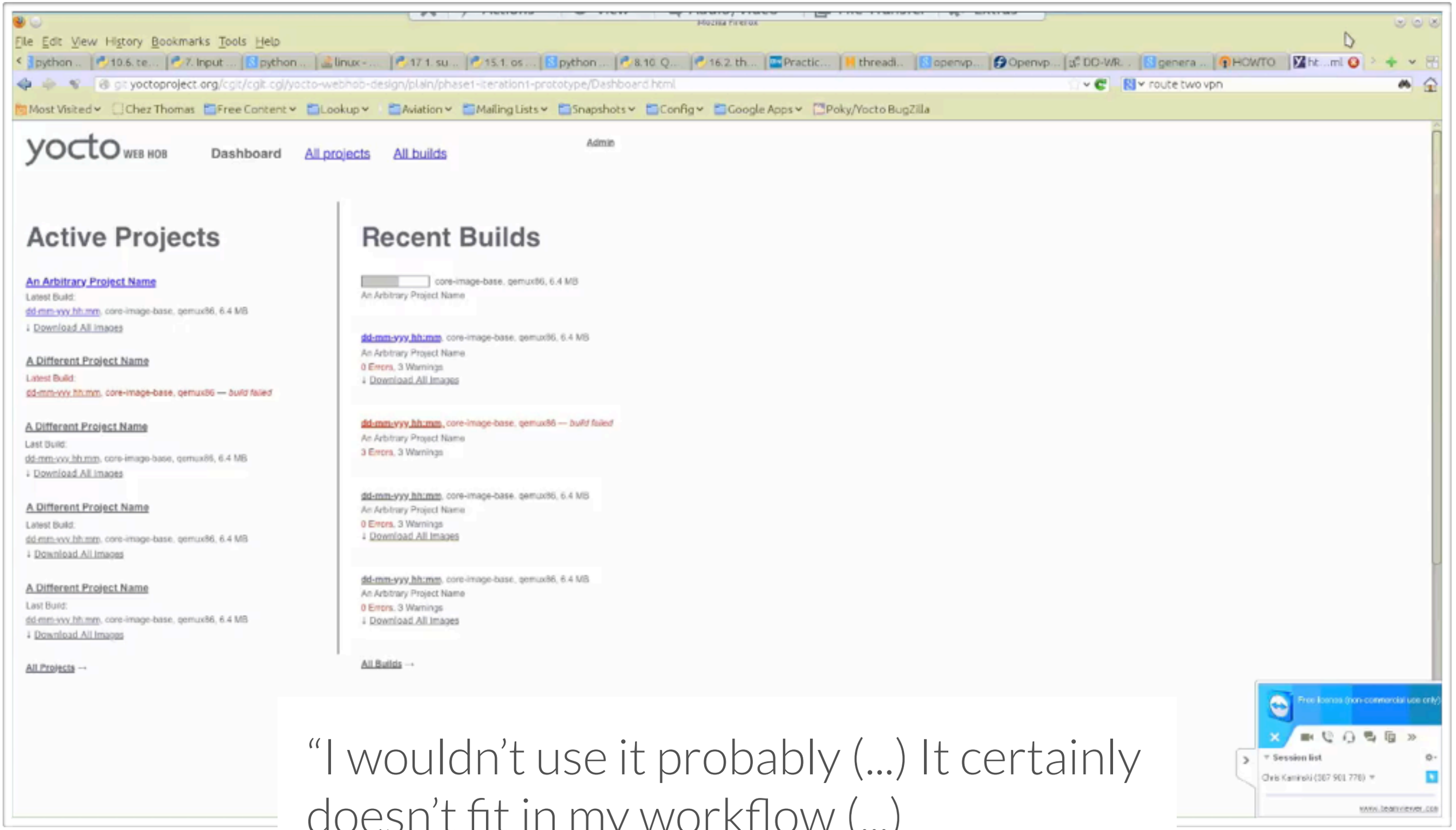


Personally I don't like the idea to give so much control, because I think it's going to be a nightmare for someone supporting users.

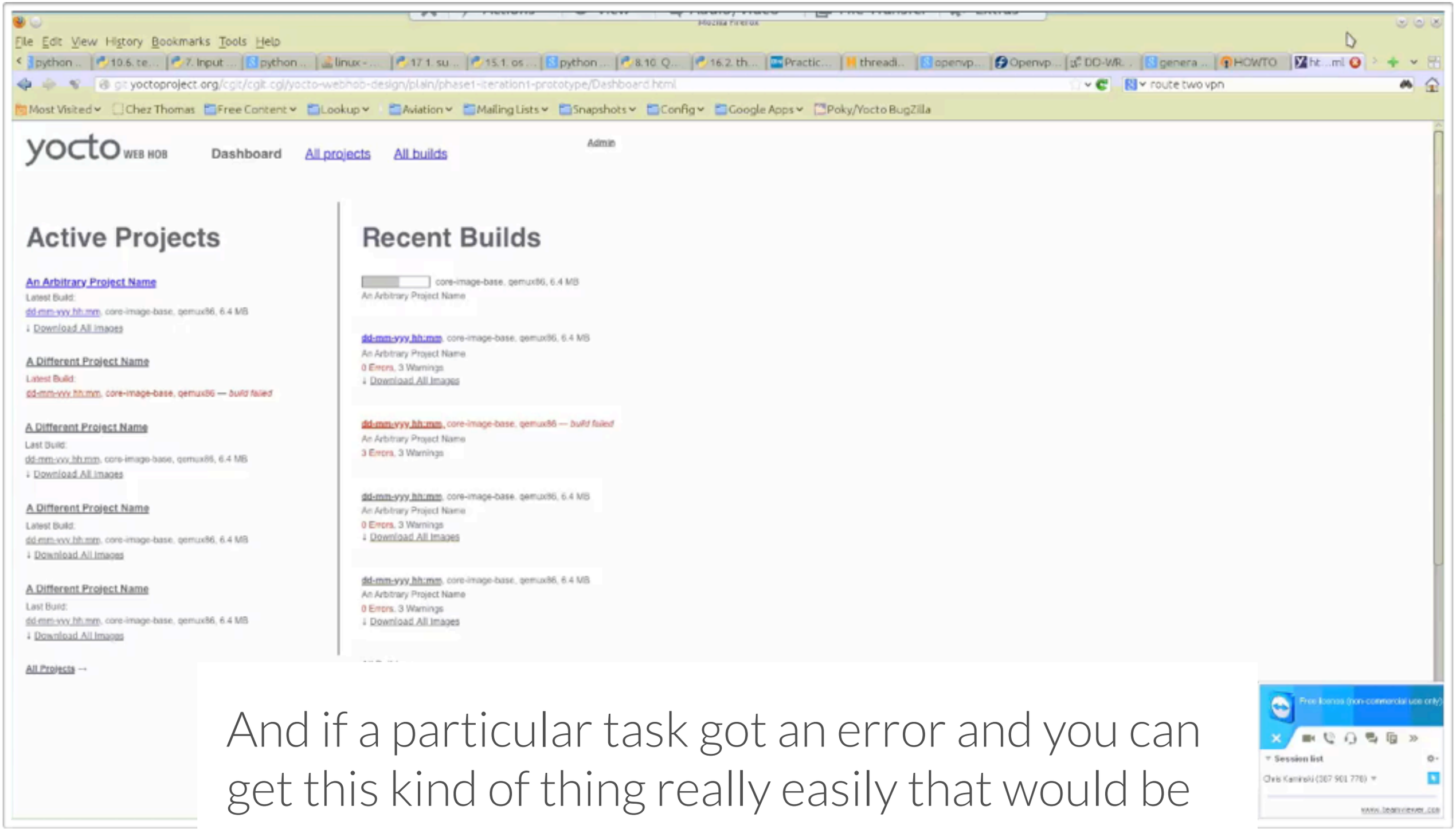


If you are going to provide this kind of feature I would expect to be able to disable it. Otherwise it's going to be a nightmare"

builds & metrics

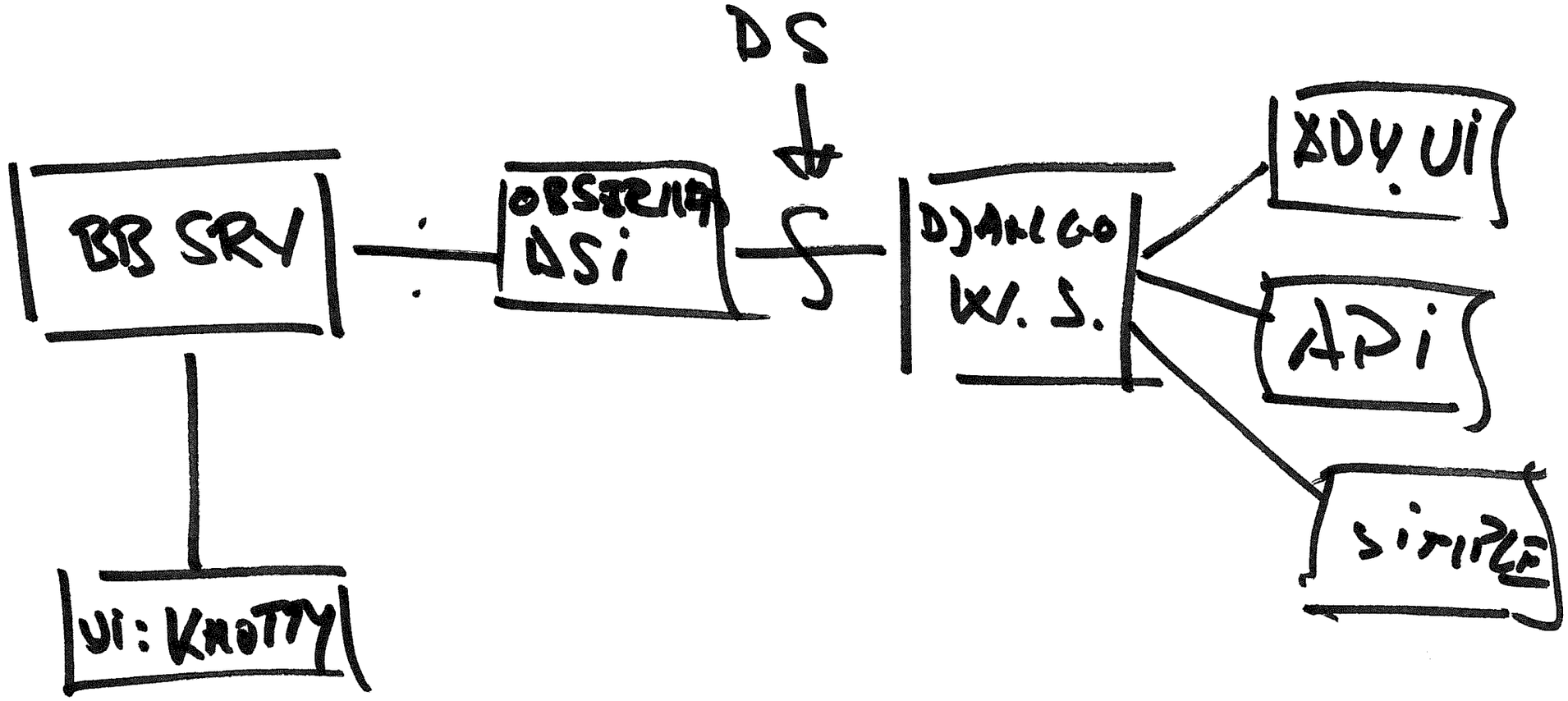


"I wouldn't use it probably (...) It certainly doesn't fit in my workflow (...)



And if a particular task got an error and you can get this kind of thing really easily that would be nice. I can see that.

```
186 class Build_File(models.Model):
187     bpackage = models.ForeignKey(Build_Package, related_name='filelist_bpackage')
188     path = models.FilePathField(max_length=255, blank=True)
189     size = models.IntegerField()
190 
191 class Target_File(models.Model):
192     tpackage = models.ForeignKey(Target_Package, related_name='filelist_tpackage')
193     path = models.FilePathField(max_length=255, blank=True)
194     size = models.IntegerField()
195 
196 
197 class Recipe(models.Model):
198     name = models.CharField(max_length=100, null=True)
199     version = models.CharField(max_length=100, null=True)
200     layer_version = models.ForeignKey('Layer_Version', related_name='recipe_layer_version')
201     summary = models.CharField(max_length=100, null=True)
202     description = models.CharField(max_length=100, null=True)
203     section = models.CharField(max_length=100, null=True)
204     license = models.CharField(max_length=200, null=True)
205     licensing_info = models.TextField(null=True)
206     homepage = models.URLField(null=True)
207     bugtracker = models.URLField(null=True)
208     author = models.CharField(max_length=100, null=True)
209     file_path = models.FilePathField(max_length=255)
210 
211 
212 class Recipe_Dependency(models.Model):
213     TYPE_DEPENDS = 0
214     TYPE_RDEPENDS = 1
215 
216     DEPENDS_TYPE = (
217         (TYPE_DEPENDS, "depends"),
218         (TYPE_RDEPENDS, "rdepends"),
219     )
220     recipe = models.ForeignKey(Recipe, related_name='r_dependencies_recipe')
221     depends_on = models.ForeignKey(Recipe, related_name='r_dependencies_depends')
222     dep_type = models.IntegerField(choices=DEPENDS_TYPE)
223 
224 class Layer(models.Model):
225     name = models.CharField(max_length=100)
226     local_path = models.FilePathField(max_length=255)
227     layer_index_url = models.URLField()
228 
229 
```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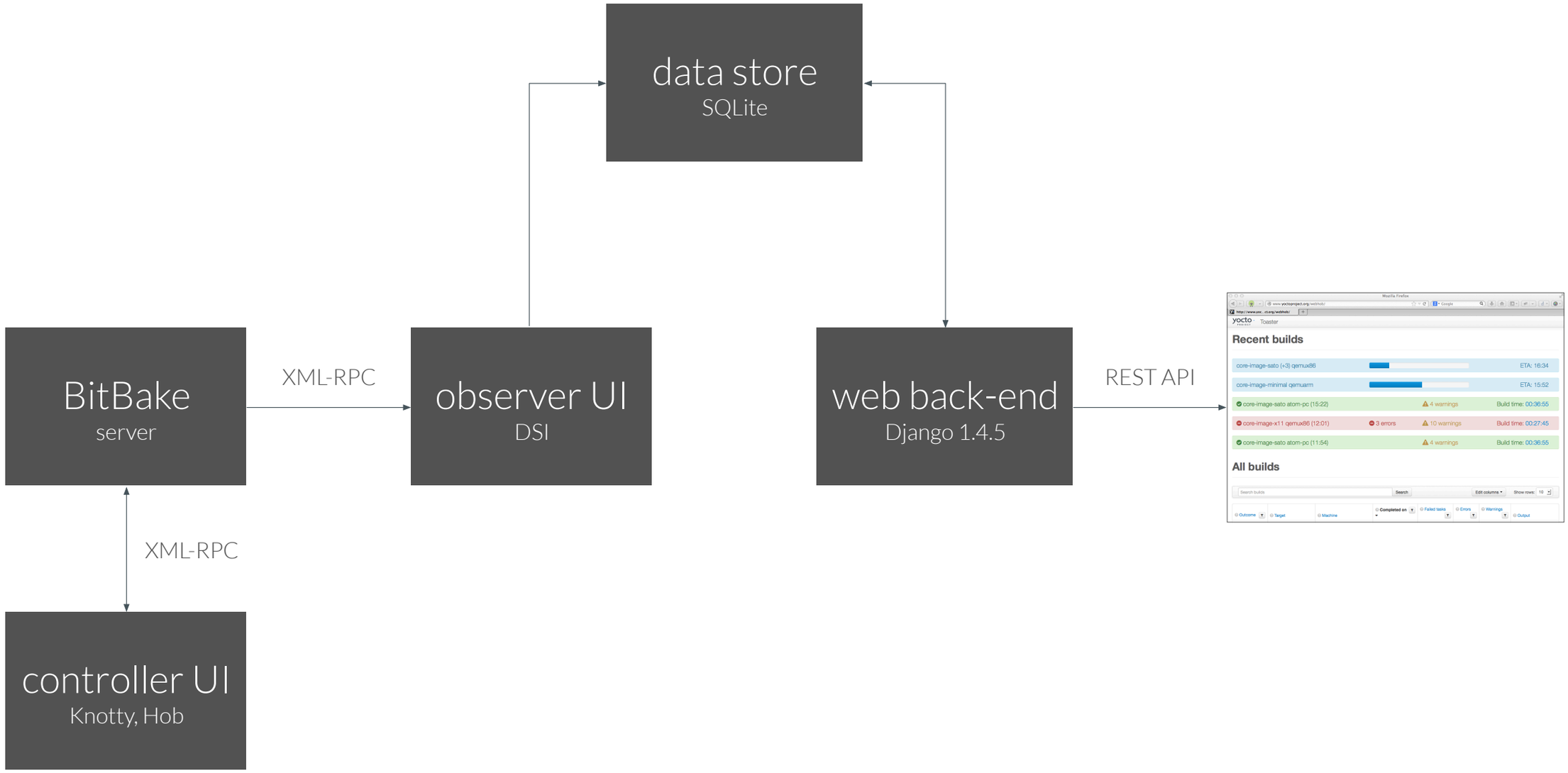
BB SRV
DJANGO
W. S.
XDV UI
API
VI : KNOTTY


data store
SQLite
BitBake
server
XML-RPC
observer UI
DSI
web back-end
Django 1.4.5
REST API
Recent builds
core-image-sato (+3) qemux86
ETA: 16:34
core-image-minimal qemuarm
ETA: 15:52
core-image-sato atom-pc (15:22)
4 warnings
Build time: 00:36:55
core-image-x11 qemux86 (12:01)
3 errors
10 warnings
Build time: 00:27:45
core-image-sato atom-pc (11:54)
4 warnings
Build time: 00:36:55
All builds
XML-RPC
controller UI
Knotty, Hob

Usability testing

A process that employs people as testing participants who are representative of the target audience to evaluate the degree to which a product meets specific usability criteria.

Handbook of Usability Testing 2nd Ed., J. Rubin and D. Chisnell

Ethnography

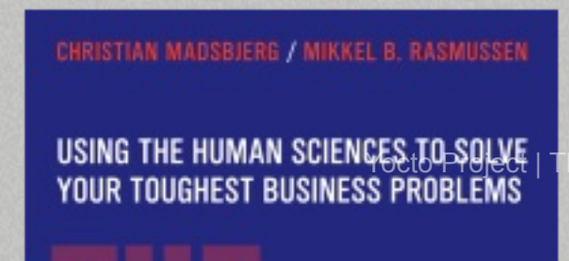
Ethnography (...) has always meant the attempt to understand another life world using the self - as much of it as possible - as the instrument of knowing.

Resistance and the Problem of Ethnographic Refusal, Sherry B. Ortner

About ReD

Who We Are

ReD Associates is an innovation and strategy consultancy. The anthropologists, sociologists, economists, journalists, and designers who make up ReD employ the methods of social science to study human behavior.



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Professor Kuper on BBC Radio 4's 'Thinking Allowed'

Adam Kuper is one of a panel discussing "dirt and why it provokes such fear, loathing and occasionally desire" (broadcast 8 June 2011).

Professor Adam Kuper

Adam Kuper is a specialist on the ethnography of Southern Africa, and he has written widely on the history and theory of anthropology.

Selected Publications

2009 *Incest and Influence: The Private Life of Bourgeois England*, Cambridge MA: Harvard University Press.

2005 *The Reinvention of Primitive Society*, London: Routledge. 2004 (Edited, with Jessica Kuper) The Social Science Encyclopedia, third edition, London: Routledge.

1999 *'Culture': The Anthropologists' Account*. Cambridge MA: Harvard University Press.

1996 *Anthropology and Anthropologists: The Modern British School*. Third edition, London: Routledge.

1994 *The Chosen Primate: Human Nature and Cultural Diversity*. Cambridge, Mass.: Harvard University Press.

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Ethnography

We also all imbibed the faith that field research (...) by participant observation would yield a more accurate view of another way of life than any other method. But how was it done? We put nervous questions to the faculty but were told that there was no fixed procedure, nothing that could be taught.

Anthropology and Anthropologists Forty Years On, A. Kuper in Anthropology of This Century Issue 11 (October 2014) - http://aotcpress.com/articles/anthropology-anthropologists-forty-years/

BORING

Fisher-Price®

Please stand up everyone

Sit down if you have contributed to Toaster

Sit down if you have submitted a patch for BitBake, OE core or Poky over the past 6 months

Sit down if you don’t like beer

Sit down if you are absolutely terrified by the idea of being listened to

A task

Would you be able to help me figure out why the package **libkmod** was installed in the core-image-minimal root file system that I created on October 10th?

?

Credits

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Slide 32: Jan Chipchase - PopTech 2011 by PopTech under CC BY-SA 2.0

thank you

https://lists.yoctoproject.org/listinfo/toaster

belen.barros.pena@linux.intel.com